UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,939	11/18/2003	Vitali Victor Lissianski	839-1458	4528

30024 7590 08/02/2004

NIXON & VANDERHYE P.C./G.E.
1100 N. GLEBE RD.
SUITE 800
ARLINGTON, VA 22201

EXAMINER	
RINEHART, KENNETH	
ART UNIT	**PAPER NUMBER**
3749	

DATE MAILED: 08/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/714,939	LISSIANSKI ET AL.
	Examiner	Art Unit
	Kenneth B Rinehart	3749

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25,27-29 and 32-38* is/are rejected.

7)☒ Claim(s) *26,30 and 31* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2/19/2004, 6/16/2004*

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 15, 18, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ake et al in view of Knowles. Ake et al discloses combusting coal in a primary combustion zone of the combustion unit under conditions of low or no excess oxygen during combustion in the zone (col. 2, line 57); b. generating carbon rich fly ash during combustion (flyash recycle, figure 1) ; releasing mercury during the combustion into flue gases generated by the combustion (This release inherently occurs); staging combustion air by injecting combustion air in a post-combustion zone downstream of the combustion zone in the combustion unit (106, fig. 1), injecting coal into a reburn zone in the post-combustion zone and upstream of an overfire air burnout zone (124, fig. 1), combustion occurs in a low nitrogen oxide (NOx) burner (col. 2, line 57), coal reburning in the combustion system to generate carbon in fly ash generated during combustion (125, fig. 1). Ake et al discloses applicant's invention substantially as claimed with the exception of adsorbing the mercury in the flue gas with the fly ash, and collecting the fly ash with the adsorbed mercury in a combustion waste treatment system. Knowles teaches adsorbing the mercury in the flue gas with the fly ash, and collecting the fly ash with the adsorbed mercury in a combustion waste treatment system (fig. 1) for the purpose of removing mercury from the

flue gas. It would have been obvious to one of ordinary skill in the art to modify Ake et al by including adsorbing the mercury in the flue gas with the fly ash, and collecting the fly ash with the adsorbed mercury in a combustion waste treatment system as taught by Knowles for the purpose of removing mercury from the flue gas so that environmental regulations are met.

Claims 14, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ake et al in view of Knowles as applied to claim 1 above, and further in view of Pennline. Ake discloses an amount of reburning fuel is in a range of' about 10 about 30 percent of a total heat input fuel used for the combustion of coal, an amount of reburning fuel is in a range of about 15 to about 25 percent a total heat input fuel used for the combustion of coal (col. 6, line 21). Ake discloses applicant's invention substantially as claimed with the exception of injecting activated carbon downstream of the post-combustion zone and upstream of the collection of fly ash. Knowles teaches injecting activated carbon downstream of the post-combustion zone and upstream of the collection of fly ash (30, fig. 1) for the purpose of reducing mercury in the flue gas. It would have been obvious to one of ordinary skill in the art to modify Ake by including injecting activated carbon downstream of the post-combustion zone and upstream of the collection of fly ash as taught by Pennline for the purpose of reducing mercury in the flue emissions to meet environmental requirements.

Claims 1-14, and 18-25, 27, 28, 32-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rini et al in view of Pennline et al. Rini et al shows combusting coal in a primary combustion zone of the combustion unit under conditions of low or no excess oxygen during combustion in the zone (14, fig. 1); generating carbon rich fly ash during combustion (abstract); releasing mercury during the combustion into flue gases generated by the combustion

(This release will inherently occur); staging combustion air by injecting combustion air in a post-combustion zone downstream of the combustion zone in the combustion unit (106, 104, fig. 1); a level of excess oxygen during combustion is less than about 1.0%, wherein a level of excess oxygen during combustion is less than about 0.5%, a level of excess oxygen during combustion is less than a stoichiometric amount of oxygen needed for the combustion of the coal (col. 20, line 24), wherein the post-combustion zone includes an overfire burnout zone into which is injected the staged combustion air (col. 20, lines 37-42), a loss on ignition level of the fly ash is at least 0.5 percent (abstract), a stoichiometric ratio (SR1) of the combustion of coal in a primary combustion zone of the combustion system is in a range of about 0.5 to about 1.1 (col. 9, line 47), combustion occurs in a low nitrogen oxide (NOx) burner (col. 1, lines6-13), combusting the coal in a primary combustion zone of the combustion system, wherein elemental mercury (Hg) is released in the flue gas produced by the combustion (14, fig. 1, This release will inherently occur); b. staging combustion air supplied to the combustion system by adding a portion of the combustion air to the primary combustion zone and a second portion of the combustion air to an overfire air zone downstream of the combustion zone (fig. 1); maintaining a level of excess oxygen in the primary combustion zone of no greater than 1.0 percent so as to release active carbon in the fly ash generated by the combustion of coal (col. 7, line 39); wherein a stoichiometric ratio (SR) of the combustion of coal in a primary combustion zone of the combustion system is in a range of about 0.5 to about 1.1 (col. 7, line 37), a stoichiometric ratio (SR1) of the combustion of coal in a primary combustion zone of the combustion system is in a range of about to about 0.8 to about 1.05 (col. 7, line 37), a) a primary combustion zone receiving combustion air and having a downstream passage for flue gases and fly ash generated

during combustion (14, fig. 1), a coal injector adapted to inject coal into the primary combustion zone(48, 50, fig. 2); c) an air injector adapted to introduce combustion oxygen into the combustion zone, wherein an amount of excess oxygen in the zone no greater than 1.0 percent so as to release active carbon in the fly ash generated by the combustion of coal (abstract fig. 2, col. 7, line 37); an overfire air burnout zone downstream of the combustion zone and included in the downstream passage wherein combustion air is injected into the burnout zone (fig. 1); combusting coal a combustion zone of the combustion unit under conditions of low or no excess oxygen during combustion in the zone (14, fig. 1); b. generating carbon rich fly ash during combustion (abstract); releasing mercury during the combustion into flue gases generated by the combustion (This release will inherently occur); wherein a level of excess oxygen in flue gas is less than 2.0% (col. 21, line 10), a level of in flue gas is less than 1.0% (col. 21, line 10). Rini discloses applicant's invention substantially as claimed with the exception of adsorbing the mercury in the flue gas with the fly ash, and collecting the fly ash with the adsorbed mercury in a combustion waste treatment system, cooling the fly ash with the active carbon to a temperature below 450 degrees Fahrenheit to facilitate the adsorption of the mercury, wherein the mercury from combustion is mostly elemental mercury (Hg0) and further comprising oxidizing the elemental mercury as the flue gases cools, the oxidized mercury is removed from flue gas in a scrubber, the combustion waste treatment system includes a particle control device which captures the fly ash with adsorbed mercury and discharges the captured fly ash to a fly ash collection unit, the combustion waste treatment system includes a particle control device which captures the fly ash after the fly ash cools to a temperature no greater than about 400 degrees Fahrenheit, injecting activated carbon downstream of the post-combustion zone and upstream

collection ash, injecting coal into a reburn zone in the post-combustion zone and upstream of an overfire air burnout zone, d. oxidizing the elemental mercury by generating oxidized mercury (Hg+2); adsorbing the elemental mercury in the flue gas by the active carbon in the fly ash, and collecting the fly ash with adsorbed mercury in a combustion waste treatment system, cooling the fly ash with the active carbon to a temperature below 450 degrees Fahrenheit to facilitate the adsorption of the mercury, cooling the ash with the active carbon to a temperature no greater than 350 degrees Fahrenheit to facilitate the adsorption the mercury, the combustion waste treatment system includes a particle control device which captures the fly ash with adsorbed mercury and discharges the captured fly ash to a fly ash collection unit, the combustion waste treatment system includes a particle control device which captures the fly ash after the fly ash cools to a temperature no greater than 400 degrees Fahrenheit, a combustion treatment waste system coupled to the flue gas output and a discharge for captured particulate waste and wherein said primary combustion zone burns the coal such that the fly ash has active carbon to adsorb the mercury released in the flue gas, adsorbing the mercury in the flue gas with the fly ash, and e. collecting the fly ash with the adsorbed mercury in a combustion waste treatment system. Pennline et al teaches adsorbing the mercury in the flue gas with the fly ash, and collecting the fly ash with the adsorbed mercury in a combustion waste treatment system (abstract, 34, fig 1), cooling the fly ash with the active carbon to a temperature below 450 degrees Fahrenheit to facilitate the adsorption of the mercury (col. 4, line 54), wherein the mercury from combustion is mostly elemental mercury (Hg0) and further comprising oxidizing the elemental mercury as the flue gases cools (col. 3, lines 14-15, col. 4, lines 55-57, col. 6, line 10, fig. 1), the oxidized mercury is removed from flue gas in a scrubber (col. 4, lines 62-67, col. 5, lines 1-3), the

combustion waste treatment system includes a particle control device which captures the fly ash with adsorbed mercury and discharges the captured fly ash to a fly ash collection unit. (34, 36, fig. 1), the combustion waste treatment system includes a particle control device which captures the fly ash after the fly ash cools to a temperature no greater than about 400 degrees Fahrenheit (col. 4, line 54, fig. 1), injecting activated carbon downstream of the post-combustion zone and upstream collection ash (30, fig. 1), oxidizing the elemental mercury by generating oxidized mercury (Hg+2) (col. 3, lines 14-15, col. 4, lines 55-57, col. 6, line 10, fig. 1); adsorbing the elemental mercury in the flue gas by the active carbon in the fly ash, and collecting the fly ash with adsorbed mercury in a combustion waste treatment system (abstract, 34, fig. 1), cooling the fly ash with the active carbon to a temperature below 450 degrees Fahrenheit to facilitate the adsorption of the mercury (col. 1, line 43, col. 4, line 53), cooling the ash with the active carbon to a temperature no greater than 350 degrees Fahrenheit to facilitate the adsorption the mercury (col. 1, line 43, col. 4, line 53), the combustion waste treatment system includes a particle control device which captures the fly ash with adsorbed mercury and discharges the captured fly ash to a fly ash collection unit (34, 36, fig. 1), the combustion waste treatment system includes a particle control device which captures the fly ash after the fly ash cools to a temperature no greater than 400 degrees Fahrenheit (fig. 1, col. 1, line 43, col. 4, line 53), a combustion treatment waste system coupled to the flue gas output and a discharge for captured particulate waste and wherein said primary combustion zone burns the coal such that the fly ash has active carbon to adsorb the mercury released in the flue gas (fig. 1, abstract), a duct downstream of the primary combustion zone to cool the flue gas to collect fly ash with the absorbed mercury (30, fig. 1), . adsorbing the mercury in the flue gas with the fly ash (abstract), and e. collecting the fly ash with the adsorbed

mercury in a combustion waste treatment system (34, 36, fig. 1), oxidized mercury is removed in a scrubber (col. 4, lines 1, col. 5, lines 1-3) for the purpose of controlling mercury emissions. It would have been obvious to one of ordinary skill in the art to modify Rini et al by including adsorbing the mercury in the flue gas with the fly ash, and collecting the fly ash with the adsorbed mercury in a combustion waste treatment system, cooling the fly ash with the active carbon to a temperature below 450 degrees Fahrenheit to facilitate the adsorption of the mercury, wherein the mercury from combustion is mostly elemental mercury (Hg0) and further comprising oxidizing the elemental mercury as the flue gases cools, the oxidized mercury is removed from flue gas in a scrubber, the combustion waste treatment system includes a particle control device which captures the fly ash with adsorbed mercury and discharges the captured fly ash to a fly ash collection unit, the combustion waste treatment system includes a particle control device which captures the fly ash after the fly ash cools to a temperature no greater than about 400 degrees Fahrenheit, injecting activated carbon downstream of the post-combustion zone and upstream collection ash, injecting coal into a reburn zone in the post-combustion zone and upstream of an overfire air burnout zone, d. oxidizing the elemental mercury by generating oxidized mercury (Hg+2); adsorbing the elemental mercury in the flue gas by the active carbon in the fly ash, and collecting the fly ash with adsorbed mercury in a combustion waste treatment system, cooling the fly ash with the active carbon to a temperature below 450 degrees Fahrenheit to facilitate the adsorption of the mercury, cooling the ash with the active carbon to a temperature no greater than 350 degrees Fahrenheit to facilitate the adsorption the mercury, the combustion waste treatment system includes a particle control device which captures the fly ash with adsorbed mercury and discharges the captured fly ash to a fly ash collection unit, the

combustion waste treatment system includes a particle control device which captures the fly ash after the fly ash cools to a temperature no greater than 400 degrees Fahrenheit, a combustion treatment waste system coupled to the flue gas output and a discharge for captured particulate waste and wherein said primary combustion zone burns the coal such that the fly ash has active carbon to adsorb the mercury released in the flue gas, adsorbing the mercury in the flue gas with the fly ash, and e. collecting the fly ash with the adsorbed mercury in a combustion waste treatment system as taught by Pennline et al for the purpose of controlling mercury emissions so that clean air regulations are met.

Allowable Subject Matter

Claims 26, 30, and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents are cited to further show the state of the art with respect to flyash in general: Nehls (5320051).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth B Rinehart whose telephone number is 703-308-1722. The examiner can normally be reached on 7:30 -4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ira Lazarus can be reached on 703-308-1935. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KBR

Kenneth Rinehart
KENNETH RINEHART
PRIMARY EXAMINER